

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE COM-
MANDER ISLANDS.

BY
LEONHARD STEJNEGER AND FREDERIC A. LUCAS.

(With Plates II-IV.)

A.—CONTRIBUTIONS TO THE HISTORY OF PALLAS' CORMORANT.

BY
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About forty years ago the Great Auk (*Plautus impennis*) of the Northern Atlantic became exterminated. A vigorous search has been made for it and its remains; fabulous sums have been paid for skins and eggs; and monographers, among whom some of the most prominent ornithologists, have collected together the most minute facts bearing upon its history, and discussed in extreme detail the number of specimens extant as well as their individual history, so that the latest account of this remarkable bird fills a quarto volume of quite respectable dimensions. There are now on record about eighty mounted specimens, or skins, seventy eggs, and countless bones as being preserved in the various museums of the Old and the New World.

Within the same period another large water bird has become extinct in the North Pacific, without having as yet attracted the attention of the monographers. It is so rare in collections that only four specimens are known to exist in museums, while nobody is the proud possessor of its eggs, and no bones had been found or preserved until I was so fortunate some years ago as to rescue a few of them. Yet, this bird was the largest and handsomest of its tribe. And so little has been known of it that there is not yet printed a detailed and good description of it. The bird which has fared so badly is Pallas's Cormorant, or the Spectacled Cormorant, *Phalacrocorax perspicillatus* Pall.

I have recorded elsewhere (Proc. U. S. Nat. Mus., VI, 1883, p. 65, and Bulletin U. S. Nat. Mus., No. 29, Res. Orn. Expl. Kamtsch., p. 180) my reasons for considering this species extinct and the causes which led to its extermination. It seems as if the very causes which terminated the existence of the Great Auk worked the same result in Pallas's Cormorant, and it is even probable that if the latter, at some earlier period,

also inhabited the other Aleutian Islands, as is most likely, volcanic eruptions may have played a rôle in this drama as well as in that of the Great Auk. True, the latter was entirely deprived of its power of flight, but it is evident both from the measurements of the skins as well as of those of the bones, given below, that the wings of this cormorant were disproportionately small. Steller speaks of its great bulk of body and its weight, which varied between twelve and fourteen pounds,* so that one single bird was sufficient for three starving men of the shipwrecked crew.

With this bulk it combined an unusual "*stoliditas*," but it is pretty clear that this stupidity, which made them such an easy prey, was due more to their slowness of locomotion on land and in the air than to any special temperament or dullness of intellect. The natives of Bering Island inform me that the meat of this species was particularly palatable compared with that of its congeners, and that consequently, during the long winter, when other fresh meat than that of the cormorants was unobtainable, it was used as food in preference to any other. In brief, all the circumstances combined to make short work at exterminating this bird at its last refuge, for there is no evidence that it has ever been found during historical times in any other locality than Bering Island. The result was that Pallas's Cormorant, which was found by Steller and his shipwrecked comrades on that desolate island in 1741, and which at that time—that is, before man ever visited its rocky shores—occurred there in great numbers, "*frequentissimi*," as Steller says, became extinct in about a hundred years from its discovery. The history of this bird forms an interesting parallel to that of the great northern sea-cow (*Rytina gigas*).

Up to 1837 or 1839 Steller seems to have been the only naturalist who had seen this bird, for, although naming it in his Zoographia, all Pallas knew of the species was derived from Steller's observations, whose description he merely quotes. It is, then, safe to conclude that it was not among the many water birds collected by Billings's expedition, which brought home such rich spoils from the Kuriles and the Aleutian Island, but which did not touch at Bering Island. In the above-mentioned year Captain Belcher, with the *Sulphur*, visited Sitka, and was there presented by Kuprianoff, the Russian governor, with one of the specimens of this bird in his possession. This specimen is evidently the one now in the British Museum, while the others went to the St. Petersburg Academy, from which one was again secured by the Leyden Museum. Although obtained from the governor in Sitka, there is nothing to indicate whence came the specimens; but inasmuch as Bering Island at that time belonged to the administrative district of Sitka, at which port all the furs were received from that island before being shipped to Europe,

* The average length of wing of adult *Ph. perspicillatus* is 355mm (see table beyond) and the weight 12 to 14 pounds. Compare with this the fact recorded by me (Orn. Expl. Kamtsch., p. 186) that *Ph. urile*, the nearest ally of the present species, weighs only 5 pounds, with a length of wing of 300mm.

all vessels from Bering Island consequently first stopping at Sitka, there is every probability that the specimens in question were collected on that island. This conclusion is corroborated by the manner in which *P. perspicillatus* and *Leucosticte griseogenys* are mentioned together.

So far as known, these are the only specimens in existence, viz: Two in the museum of the Imperial Academy of Sciences in St. Petersburg; one in the British Museum, London; one in the "Rijks Museum," Leyden, Holland.

Several pictures of Pallas's Cormorant have been published. A large colored plate by Wolf, from the British Museum specimen, is in Elliot's Birds of North America, a reduced wood engraving copy of which is given in the Standard Natural History (or Riverside Natural History), vol. IV, p. 192. The same specimen is also figured in two different positions by Gould in the Zoology of the voyage of the *Sulphur*, and poorly copied in Reichenbach's "Natatorum Novitiæ." In Schlegel's "Dierentium," p. 281, there is a wood-cut, probably taken from the Leyden specimen. According to Dr. Finsch (Abh. Natur. Hist. Ver. Bremen, III, 1872, p. 20) this species, undoubtedly from one of the St. Petersburg specimens, is represented on plate V, Fig. 4, of Brandt's "Icon. Av. Ross," a work which was never published.

Dr. Theodor Pleske kindly writes me in regard to the specimens in St. Petersburg:

Through the kind offices of Dr. Pleske I have received from Professor Brandt's heirs that part of the manuscript of his unpublished monograph of the Cormorants, which relates to the species in question, with permission to publish it. The description is very full, and being the only accurate and detailed description of the species I take great pleasure in printing it in full. In order to avoid any errors I deem it best to publish it in the language in which it was originally written. I have preceded this description with a synonymy which is thought to be nearly exhaustive.

Phalacrocorax perspicillatus PALL.

- 1826.—*Phalacrocorax perspicillatus* PALLAS, Zoogr. Ross. As. II, p. 305.—GOULD, Zool. Sulphur, p. 49, pl. xxxii (1844).—BONAPARTE, Consp. Av. II, p. 167 (1855).—*Id.*, Compt. Rend., 1856, XLIII, p.—TACZANOWSKI, Orn. Faun. Vert. Sibir., p. 66 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 41.—RIDGWAY, Nomencl. N. Am. B., p. 51 (1881).—*Id.*, Man. N. Am. B., p. 81 (1887).—COUES, Check L. and Diet., p. 118 (1882).—*Id.*, Key, 2 ed., p.—(18—).—*Id.*, Auk, 1884, p. 144.—*Id.*, Key, 3 ed., p.—(18—).—STEJNEGER, Pr. U. S. Nat. Mus, VI, 1883, p. 65.—*Id.*, *ibid.*, x, 1887, p. 138.—*Id.*, Auk, 1884, p. 173.—*Id.*, Orn. Expl. Kamtsch., pp. 180, 318 (1885).—*Id.*, Stand. Nat. Hist., IV, p. 191, Fig. 92 (1885).—BAIRD, BREWER, & RIDGWAY, Water B., N. Am., II, p. 164, fig. (1884).—A. O. U. Code and Check L., p. 351 (1886).
- 1858.—*Graculus perspicillatus* LAWRENCE, in Baird, B. N. Am., p. 877 (1858).—SCHLEGEL, Mus. P.-Bas, Pelec., p. 17 (1863).—*Id.*, Dierentium, p. 281, fig. (1871).—ELLIOT, B. N. Am., pt. —, pl. 50 (—).—GRAY, Hand-l., III, p. 127 (1871).—COUES, Key, 1 ed., p. 304 (1872).—*Id.*, Check L., p. 101 (1873).
- 1850.—*Graculus urile* REICHENBACH, Natat. Novit., pl. XVII, Figs. 2311 and 2312 (*acc* GMEL.) (Cf. BONAP., Consp. Av. I, p. 168, and A. B. MEYER, Index Reichenb., p. 44; no name on the plate!)

Brandt's description, here published for the first time, is literally as follows:

DESCRIPTIO.

Carbo perspicillatus specierum generis *Carbonum* hucusque notorum maximam sistere videtur. Corporis enim mole *Carborem cormoranum* superat.

Rostrum robustum, satis altum, modice elongatum, nigrum, apice summo albicanti-corno, basi marginibusque tamen corneo. Culminis basis supra rotundata, convexa, medium supra subrectum. Culminis margine anterioris subrecti apex supra dertri basin hand prominens sed angusta sutura distinctum. Culminis superior facies nec non paratonorum atque gnathidiorum apice unciato, acuto, elongato, gonydem in rostro clauso longe superante. Exterior facies tenuiter per longitudinem subelevato-striata, striis teneris plus minusve parallelis. Dertrum in baseos faciei superioris lateribus sulco arcuato satis profundo exaratum, in facie laterali autem sulcis parum distinctis, transversis, obliquis, subparallelis 2 vel tribus instructum. Gonys subrecta et in medio vix prominens. Myxa apice truncato rotundata.

Frontis antica pars, genae, regio ophthalmica, spatium angustum pone oris angulum, mentum et gulae summum initium nuda cinabarina, albo et coeruleo varia ut in gallopavone (Steller). In genis pennae brevissimae, solitariae, sparsae. Oculi annulo membranaceo, nudo, elevato, subelliptico, lato, albo, perspicillum quodammodo aemulante, eincti. Inter oculi anulum et superiorem oris anguli marginem calvum spatium triangulare pennis brevibus obsessum.*

Alae complicatae vix ad uropygii posteriorem extremitatem porrigentes.

Cauda inverti subspathulata, basi angustior, e pennis 12 composita.

Tarsi pro magnitudine admodum breves.

Color in universum ater. Capitis anterior pars cum gula initio violaceonitens. Capitis posterior pars, collum, pectus, abdomen, dorsum, crissum et uropygium obscure vel aureo viride nitentia luce angulo plus minusve recto in observatoris oculos reflexa plus minusve obscure violascentia. Pennae parapterii et humerales nec non tectrices alarum supra e subpurpurascente violaceo-nitidae, anguste nigro-marginatae, rotundatae vel obtuse subacuminatae, apice fere subellipticae. Remiges primariae et tectrices alarum inferiores e subfusciscenti nigrae. Remiges secundariae nigrae, limbo externo plus minusve subnitide purpurascente violaceae. Cauda cum tectricibus atra, subopaca. Rectricum scapi supra ad apicem usque albi, marginibus nigricantibus, apice autem cum inferiore facie nigri. Frontis posterioris partis et verticis pennae dilatatae medio atrae marginibus subpurpureo-violascente vel interdum subvirescente nitidulae in cristam subtetragonam antice angustiorum basi latam, subrectam retrorsum spectantem, postice subtruncatam, 3" fere longam apice 2" latam insignem elevatae. In occipitis postrema parte et cervicis summo crista alia 2" longa 2½" lata, flabelliformis, basi angustior e pennis satis latis atris margine virescentibus media plus minusve subpurpureiscentibus formata, retrorsum spectans conspicitur. In frontis medio supra oculos, in temporibus et in lateribus superioris partis colli pennae candidae angustae ¼ ad ½ lineae latae elongatae, 1-3" longae, lineares, acutae, fere subsetaceae, subsolitariae sparsae inveniuntur, quarum quae in fronte sunt breviores, interdum pollicares vel paulo ultra; quas vero in collo observare licet multo longiores, 2-3" longi evadunt. Praeterea vero etiam in temporibus et collo pennulae albae breves penicilliformes apice tantum radiolatae. In femoribus macula candida triangularis a quovis hypocondrio late incipiens et ad crus usque angulo acuminatio extensa e pennis longis, valde acuminatis apicibus radiolis rarioribus compositis formata. Pedes atri unguibus obscure corneis.

Feminae Stellero auctore et cristis et membrana perspicilliformi, alba oculos late eingente carent.

Pondus Stellero auctore 12-14 librarum.

* Ob hanc annulum peculiarem Pallasius haud incommode speciem nostram perspicillatum nominavit.

Mensurae avis adultae in Museo Academico servatae.

A rostri apice ad caudae apicem.....	39"
ad frontem.....	3" 6'''
ad oris angulum.....	4" ½'''
A fronti ad caudae basin.....	27" 10'''
dorsi initium.....	14" 7'''
Ab alarum angulo humerali ad remigum apicem.....	13" 3'''
Caudae longitudo.....	7" 5'''
Tarsi longitudo.....	2" 6'''
Longitudo digiti interni ad unguis basin.....	1" 3'''
secundi.....	2" 1'''
tertii.....	3" 1'''
quarti seu externi.....	4" 2'''

I have thought it useful to tabulate the measurements given by the various describers reduced to millimeters:

	Brandt, Specimen in Museum St. Petersburg.	Gould, Specimen in British Mu- seum.	Schlegel, Specimen in Leyden Mu- seum.
Total length.....	1055	914	.....
Bill to forehead.....	95	.....	.....
Bill to gape.....	109	.....	.....
Bill.....	.....	102	81
Height of bill in middle.....	.....	.....	18
Wing.....	359	356	351
Tail.....	201	229	189
Tarsus.....	68	76	.....
First toe, without claw.....	34	.....	.....
Second toe.....	56	.....	.....
Third toe.....	89	.....	.....
Fourth toe.....	113	.....	168

I have already stated that no bones of this species have been preserved in museums until I was so fortunate as to find a few fragments evidently belonging to this bird. These Mr. Frederic A. Lucas has kindly undertaken to describe and illustrate in the second part of this paper.

The conditions under which they were found I have already described elsewhere (*Deutsche Geograph.*, *Bla'tte VIII*, p. 272), but a brief account may not be out of place in the present connection.

During my circumnavigation of Bering Island I landed on September 1, 1882, at Pestshanij Mys near the northwestern extremity of the island. Ascending the steep coast escarpment which is here about 35 feet high, I found near the edge of the terrasse a rather extensive deposit of bones of various mammals and birds arranged in thin layers of sand and sod alternating. The average thickness of the deposit was about 2 feet, and the present area covered in the neighborhood of 600 square feet, though it was evident that it was formerly of much greater extent, the ocean having encroached upon the land and carried away great portions of the terrasse. The bones were in fairly good condition, some of the smaller and more delicate ones even excellently well preserved, and none of them showed signs of violence. There were bones of the Arctic Fox, the Sea-otter, the Sea Lion, and other species of seals, as well as various

kinds of water birds. Among the latter a particularly large pelvis of a *Phalacrocorax* at once attracted my attention, and as I had had Pallas's Cormorant on my mind since I started from Washington I was not slow in concluding that I had to do with the bones of this bird. Had I had time to dig out the whole deposit I should probably have obtained more bones, but with the above suspicion I did as much digging and collected as many bird bones as the circumstances would allow.

A full account of this find is given by Mr. Lucas in his report which forms the remaining portion of this article.

B.—DESCRIPTION OF SOME BONES OF PALLAS' CORMORANT (*PHALACROCORAX PERSPICILLATUS*.)

BY

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Dr. Stejneger has very kindly placed in my hands for description the bones above mentioned. They are as follows:

Rostral portion of cranium in advance of the fronto-nasal hinge, with attached palatines.	Right fused metacarpals, very imperfect.
Lower mandible.	Three pelves, lacking pubic bones.
Right ramus of lower mandible.	Left femur.
Two nearly complete sterna.	Two left tibiae.
Right coracoid.	Right tibia.
Right humerus.	Two left tarsi.
Left humerus of another individual.	Second cervical vertebra.
Right ulna.	Third cervical vertebra.
Right fused metacarpals.	Ninth (?) cervical vertebra.

The more important of these are figured on the accompanying plates, all figures being of natural size, and drawn by the author.

The bones, although stained, are in a good state of preservation, being but slightly weathered, and all are from thoroughly adult individuals.

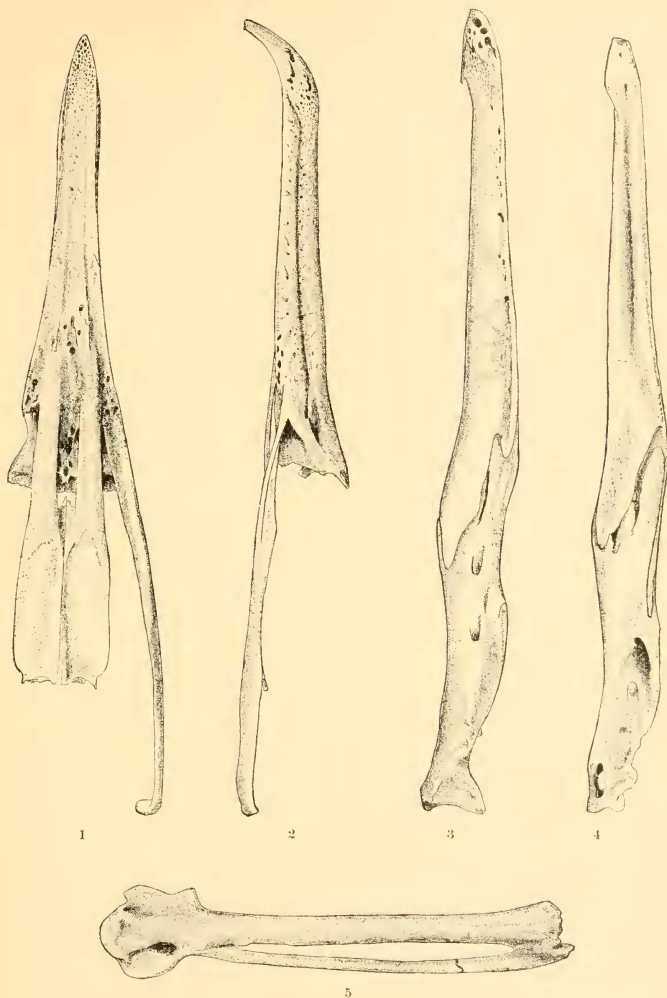
For the better and briefer description of these bones they have been compared with those of an adult *Phalacrocorax carbo*, and the opportunity has been taken to test, to some extent, the value of the subgenera *Urile* and *Phalacrocorax*, by comparing at the same time the corresponding bones of *P. urile* and *P. dilophus*.

The former bird is, for the species, large and the latter somewhat undersized, although adult.

The rostrum of *perspicillatus* is nearly as long as in *carbo*, but much more slender, and is readily distinguished from it by the deep, lateral, longitudinal groove characteristic of the sub-genus *Urile*.

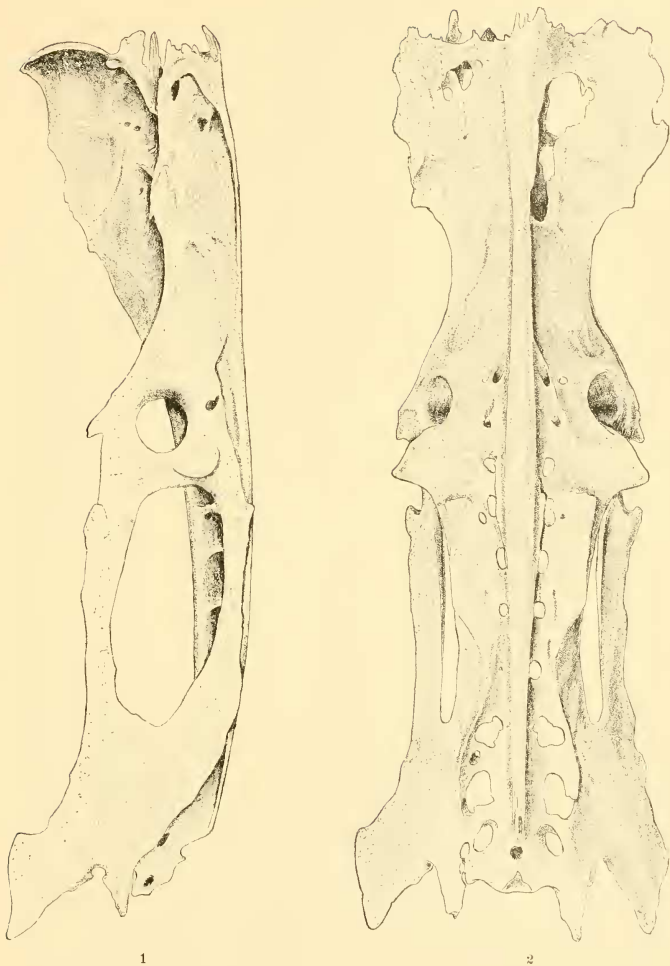
The under surface of the rostrum is less grooved, longitudinally, than that of *carbo* and much less so than that of *P. urile*.

The palatines are as long as those of *carbo*, anteriorly narrower and



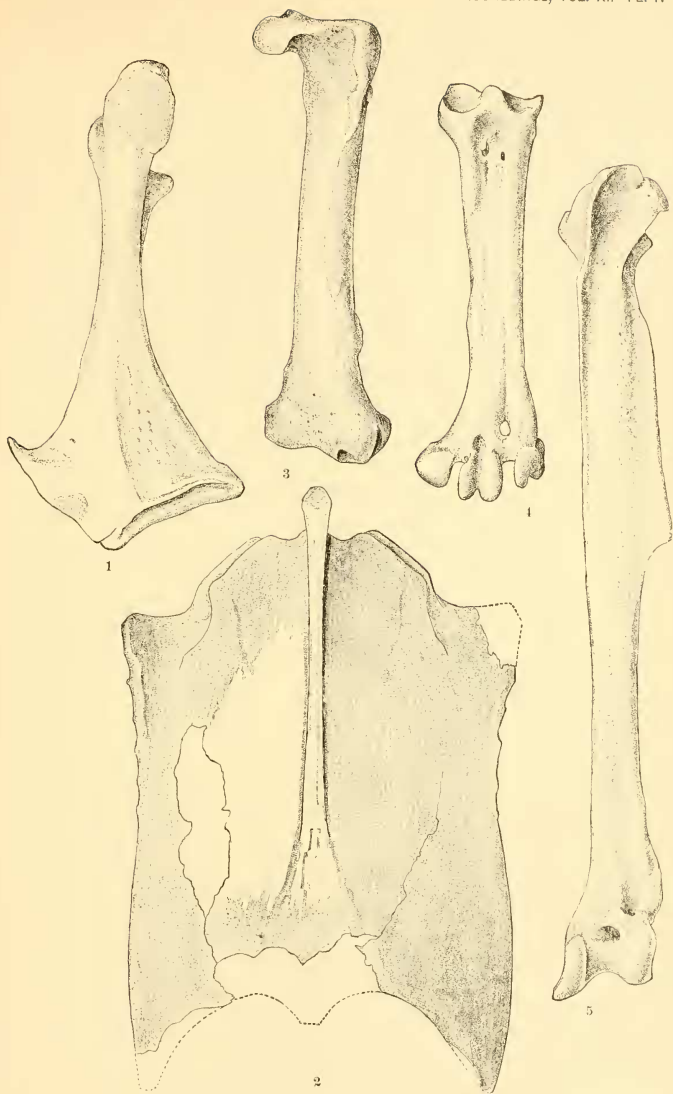
BONES OF PALLAS'S CORMORANT—NATURAL SIZE. (Page 88.)

1. Ventral aspect of rostrum.
2. Lateral aspect of rostrum.
3. Right ramus of lower mandible, external aspect.
4. Right ramus of lower mandible, internal aspect.
5. Right metacarpals.



BONES OF PALLAS'S CORMORANT—NATURAL SIZE. (Page 88.)

1. Left lateral aspect of pelvis.
2. Dorsal aspect of pelvis.



BONES OF PALLAS'S CORMORANT.—NATURAL SIZE. (Page 88.)

1. Right coracoid, ventral aspect.
2. Sternum, ventral aspect.
3. Femur, anterior aspect.

4. Tarsus, anterior aspect.
5. Tibia, anterior aspect.

